PROC. BIOL. SOC. WASH.
94(2), 1981, pp. 427–436

CHRIOLEPIS VESPA, A NEW SPECIES OF GOBIID FISH FROM THE NORTHEASTERN GULF OF MEXICO

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Abstract.—*Chriolepis vespa* is described from the northeastern Gulf of Mexico. It is distinguished from the similar *Chriolepis benthonis* Ginsburg by its greater number of second dorsal-fin elements (10 vs. 9), greater degree of scale spination, longer pectoral fin, longer fourth and shorter fifth pelvic rays, tongue shape, and color pattern. The degree of branching of pelvic-fin rays one through four increases with growth in *C. vespa*. *Varicus* Robins and Böhlke has been distinguished from *Chriolepis* Gilbert on the basis of the degree of branching of the pelvic-fin rays (unbranched in *Varicus*) and other characters which prove to be inconsistent since the discovery of *C. vespa*. The systematics of this group of seven-spined gobies which lack sensory pores is in need of revision.

The gobiid fish genus *Chriolepis* Gilbert 1892, is presently poorly known in the western Atlantic. Only two species, *Chriolepis fisheri* Herre 1942, and *Chriolepis benthonis* Ginsburg 1953, have been described, each from a single specimen. Recent collecting on the offshore continental shelf in the northeastern Gulf of Mexico produced a series of specimens of a new goby referable to *Chriolepis*. Examination of other western Atlantic specimens of this genus indicates the presence of several other undescribed species, whose descriptions await the accumulation of additional specimens.

Methods.—All measurements were made with dial calipers to the nearest 0.1 mm. Meristic and morphometric data were recorded following the procedures of Böhlke and Robins (1968) with the following emendations and additions: fleshy interorbital width is the least distance between the fleshy portions of the supraorbital area; head depth at occiput is the vertical distance from the midline of the occiput to the ventral contour of the head; head depth at preoperculum is the vertical distance from the midline above the posterior edge of the preoperculum to the ventral contour of the head; head width is the maximum horizontal distance between the opercula; intermandibular width is the distance between the posterior mandible tips; body depth at anal-fin origin is the vertical distance from the anal-fin origin to the dorsal body contour; pelvic-fin spine length is the distance from the spine insertion to its tip; pelvic-fin ray length is the distance from the ray insertion to the tip of the longest branch.

Fig. 1. Photograph of holotype of *Chriolepis vespa*, USNM 221523, 26.6 mm SL, female.

Institutional abbreviations are as follows: GCRL, Gulf Coast Research Laboratory, Ocean Springs, Mississippi; SU, Stanford University (collections now deposited at the California Academy of Sciences, San Francisco, California); USNM, United States National Museum of Natural History, Washington, D.C.; UF, Florida State Museum, University of Florida, Gainesville; UMML, University of Miami, Rosenstiel School of Marine and Atmospheric Sciences, Miami, Florida.

Chriolepis vespa, new species
Wasp goby
Figs. 1, 2, 3

Holotype.—USNM 221523, 26.6 mm SL female, northeastern Gulf of Mexico, 28°24′N, 85°15′W, R/V *BELLOWS* (cruise Bureau of Land Management, BLM 15, station III-C), collected with a 6.1 m semi-balloon trawl on 26 July 1975, depth 183 m, bottom composed of gray mud.

Paratypes.—USNM 221524, 7 (31.4–17.9 mm SL), collected with holotype; UF 28037, 1 (26.4 mm SL), 27°50′N, 84°42′W (R/V *BELLOWS* cruise BLM 15, station II-C), 27 July 1975, 183 m; UF 28038, 1 (34.1 mm SL),

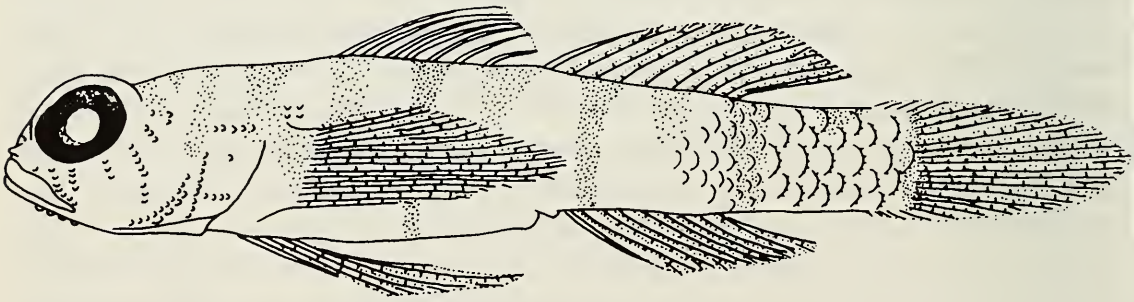

Fig. 2. Drawing of holotype of *Chriolepis vespa*.

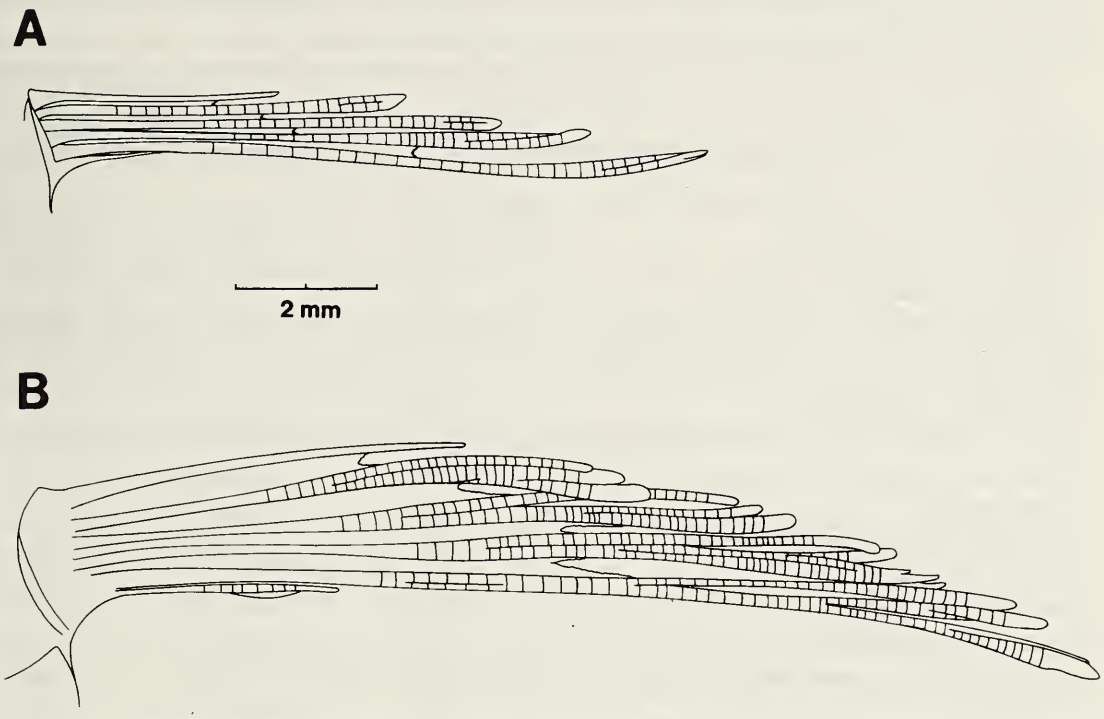

Fig. 3. Left pelvic fins of *Chriolepis vespa*. A, USNM 221524, 19.5 mm SL; B, UF 28038, 34.1 mm SL.

28°24′N, 85°15′W (R/V *BELLOWS* cruise BLM 13, station III-C), 29 August 1977, 183 m; GCRL 16972 (previously USAIC 05983), 1 (24.2 mm SL), northeastern Gulf of Mexico, 29°45.6′N, 87°46.2′W, 7 Feb. 1978, 35 m.

Diagnosis.—A plump-headed species of *Chriolepis* with 10 (I, 9) second dorsal-fin elements and 15–17 pectoral rays. Degree of branching of first through fourth pelvic-fin rays increasing with growth. Fifth pelvic-fin ray unbranched and short. Two to six rows of cycloid scales followed by six to nine rows of ctenoid scales on posterior third of body. Body pale yellowish with four olive bars with intervening olive saddles. Head with a yellow subocular bar in life.

Description.—Meristics and morphometrics of the type specimens are given below and in Table 1. Dorsal VII-10; anal 8 (7–9); pectoral 16 (15–17); vertebrae 27 (11 trunk + 16 caudal).

First through fifth spines of first dorsal fin closely spaced, sixth and seventh more widely spaced, none filamentous. Dorsal fins separate though closely spaced. First element of second dorsal fin a slender spine followed by nine branched rays (last two rays counted as one). First anal-fin element a slender spine followed by 6–8 (typically 7 or 8) branched rays (last two counted as one). Caudal fin truncate in largest specimens, rounded in others. Caudal fin composed of 16–17 total segmented rays (8–9 upper + 7–8 lower segmented rays); not all segmented rays are branched. Upper and lower

Table 1.—Meristics and morphometrics (expressed as thousandths of the standard length) of *Chriolepis vespa*.

	Holotype	Paratypes	
		Range	Mean
Meristics			
First dorsal-fin elements	VII	VII	VII
Second dorsal-fin elements	10	10	10
Anal-fin elements	8	7–9	8.2
Pectoral-fin rays	15 + 16	15–17	16.0
Morphometrics			
Standard length (mm)	26.6	17.9–34.1	25.4
Head length	305	293–354	327
Snout length	56	52–85	65
Maximum eye diameter	105	98–125	108
Interorbital width	9	8–15	11
Postorbital distance	162	147–192	169
Head depth at occiput	132	120–185	147
Head depth at preoperculum	165	155–226	167
Head width	214	196–273	232
Upper jaw length	109	111–123	116
Intermandibular width	132	112–170	149
Body depth at first dorsal-fin origin	180	130–187	163
Body depth at anal-fin origin	158	140–169	154
Caudal-peduncle depth	113	107–118	112
Caudal-fin length	263	265–308	280
Pectoral-fin length	323	284–364	322
Pelvic fin			
Spine length	124	110–128	115
Fourth ray length	293	271–365	312
Fifth ray length	90	41–87	77
Pelvic-fin base to anal-fin origin distance	327	282–371	327

caudal fin composed of 7–8 and 6–8 branched rays, respectively (13–16 total branched rays). Pectoral fin angulate (central rays longest), extending posteriorly to anal-fin origin when adpressed. Pelvic fin I, 5. Pelvic spine short (11–13% of SL). First through fourth pelvic rays increasing in length, the fourth being longest and extending past anus when adpressed (but falling short of the anal-fin origin). Fifth ray short, inconspicuous, adhering closely to the fourth and never branched (Fig. 3). First through fourth rays flattened slightly distally and branched in all specimens examined (Fig. 3); the extent of branching increases with fish length. In smaller individuals (Fig. 3A, 19.5 mm SL), the first through fourth rays with only one shallow branch. The largest specimen (Fig. 3B, 34.1 mm SL) with highly branched rays. In larger specimens, first ray with a secondary bifurcation near the tip of the medial branch of the primary bifurcation. Second, third, and fourth rays with both

secondary and tertiary bifurcations. Typically secondary and tertiary bifurcations occur on the medial branch of the preceding bifurcation. Specimens of intermediate size show intermediate patterns of pelvic fin branching.

Pelvic-fin origin under pectoral-fin origin. Pelvic fins separate, with no interspinous membrane and no membrane connecting the fins medially; however, an inconspicuous low fleshy ridge between the inner bases of the pelvic fins is evident in some specimens.

Head plump, approximately one-third of SL. Eye large (maximum diameter about one-third of head length), slightly elevated and superior. Interorbit narrow. Frontals reduced to vestiges between orbits. Mouth terminal, inclined upward approximately 30° from the horizontal. Upper jaw extends posteriorly to below anterior edge of pupil. No head pores. Sensory papillae in rows between nostrils, on preorbit, suborbit, cheek, operculum, lower jaw symphysis, posterior edge of branchiostegal membrane, above pectoral-fin base, and along lateral midline of body anterior to scale rows (Fig. 2). Anterior nostril with a short tube, about one-half pupil diameter in length. Posterior nostril with a minute tube, about one-fourth length of anterior nostril tube. Tongue shallowly indented. Buccal valves well developed.

Posterior portion of body scaled. Scales somewhat caducous. Total scale rows 9–14: 2–6 rows of cycloid scales anteriorly; 6–9 rows of ctenoid scales posteriorly. Origin of cycloid scale rows variable, from under the fifth to the ninth element of the second dorsal fin (sixth in holotype). Origin of ctenoid scales also variable, from under seventh to below last element of second dorsal fin (tenth in holotype). Four enlarged basicaudal ctenoid scales present on upper and lower caudal fin, one upper and one lower on each side. Basicaudal scales missing from left side of holotype (Fig. 2). Ctenii on each basicaudal scale large, conspicuous, and variable in number (4–12). A few additional ctenoid scales on caudal fin between basicaudal scales.

Teeth in lower jaw in four rows anteriorly. Outermost row composed of widely-spaced, enlarged recurved canines. Innermost row composed of more closely-spaced, slightly smaller recurved canines. Inner and outer rows separated anteriorly by two rows of irregular low-pointed teeth. Laterally the outermost and central rows are lacking. Only the innermost row of canines present at angle of jaw. Teeth in upper jaw in about five rows anteriorly, outermost row composed of widely-spaced, enlarged recurved canines; four rows of irregular low-pointed teeth medial to outer row with a few slightly enlarged teeth irregularly spaced within medial rows. Innermost row close-set, with teeth not enlarged as in lower jaw. Outermost row extends to angle of jaw and tooth size decreases posteriorly. Inner rows decrease in number and size posteriorly until only two irregular rows of low teeth remain at angle of jaw. Modified or enlarged lateral canines lacking in either jaw. Teeth lacking on vomer and palatines.

Color notes taken from a fresh paratype (USNM 221524, 31.4 mm SL)

supplemented by notes taken from a kodachrome of the same specimen are as follows: body pale yellowish, with pinkish tint anteriorly near pectoral base. Body translucent posteriorly (vertebral column visible through caudal peduncle). Four prominent olive, vertical bars on body; first bar under mid-spinous dorsal fin, second just posterior to second dorsal-fin origin, third connecting end of second dorsal fin with end of anal fin, fourth at caudal base. All bars extend to ventral outline of body and increase in intensity posteriorly. Two olive saddles on nape, first above preoperculum, second just anterior to pectoral-fin base. Four additional olive saddles on body, first at spinous dorsal-fin origin and one between each of the vertical bars; all saddles paler than vertical bars, and not extending below midline of body. Opercular region, lateral pectoral base, and chest cream-colored with a pink cast. Remaining body white ventrally. Head white from snout to preoperculum. Nape with an olive cast. Faint pink-orange pigment present on operculum. Bright yellow subocular bar extending vertically from orbit to angle of jaw. Lower jaw white. Branchiostegal membranes yellow. Iris golden. Spinous dorsal fin with a wide, yellow-olive band medially and a white band distally. Distal tips of spines yellow-olive. Second dorsal fin with three rows of yellow-olive spots separated by three white bands (yellow-olive proximally followed distally by alternating white and yellow-olive bands). Second dorsal-fin margin black. Anal fin yellow-olive medially, black distally. Distal black band occupies one-fifth of fin anteriorly and grades to occupy three-fifths of the fin posteriorly. Two vertical yellow bars on caudal fin followed distally by a white bar. Distal margin of fin with a black band. Lower caudal-fin rays pale yellow with sparsely scattered chromatophores. Pectoral fin yellow-orange. Pelvic fin yellow-orange proximally, gray distally.

Color of preserved (45% isopropynol) specimens (Figs. 1, 2) as follows: body pallid. Vertical bars and saddles clearly visible on body as clusters of chromatophores. Few chromatophores scattered elsewhere over dorsal and lateral aspects of body. Abdomen, thorax, ventral portion of lateral pectoral-fin base, branchiostegal membranes, and isthmus unpigmented. Nape with contracted chromatophores. Sparse chromatophores present on cheek, suborbit, preorbit, interorbit, and along upper and lower jaws. Iris black. Spinous dorsal fin with scattered chromatophores, most dense at tips of spines. Second dorsal fin with scattered chromatophores, most dense on distal margin. Anal fin unpigmented proximally, but with densely-spaced chromatophores on distal margin. Caudal fin with few scattered chromatophores centrally but with closely-spaced chromatophores peripherally on posterior and ventral margins. Upper portion of outer pectoral-fin base with chromatophores forming an irregular blotch. Few chromatophores on pectoral fin. Pelvic fin with few scattered chromatophores.

Comparisons.—Chriolepis vespa morphologically resembles *C. benthonis* Ginsburg 1953, described from a single specimen from off the Yucatan Pen-

insula in 154 m of water. The two species are similar in overall head and body shape, number of anal-fin rays (8 in *C. benthonis*), and pectoral-fin rays (16 in *C. benthonis*). They differ in number of second dorsal-fin rays (9 in *C. benthonis*) and in squamation. Although several scales are missing from the holotype of *C. benthonis,* salient differences are apparent in those that remain. In *C. benthonis* there are seven enlarged scales located mid-laterally on the caudal peduncle. Only the last three or four of these possess a few weakly developed ctenii. Small cycloid scales are present on the caudal peduncle above and below the central seven ctenoid scales. Cycloid scales also extend forward in a wedge to under the sixth element of the second dorsal fin. A few cycloid scales are present on the caudal-fin base. No enlarged basicaudal ctenoid scales are present, although these could have been lost. Ginsburg (1953) stated that modified scales were present on the caudal base but most were missing. In *C. vespa,* six to nine rows of well-developed ctenoid scales are present on the body posteriorly. Further, most scales above and below the mid-lateral series possess well-developed ctenii (as many as twelve on one scale), while the only cycloid scales present are those anterior to the mid-lateral ctenoid rows. The ctenii on most scales of *C. vespa* are larger than any of those that remain on the holotype of *C. benthonis*. In *C. vespa* a few ctenoid scales are present on the caudal fin between the modified basicaudal scales. *Chriolepis vespa* specimens and the holotype of *C. benthonis* also differ in some body proportions: *C. benthonis* has a shorter pectoral fin (248 thousandths of the SL), a shorter fourth pelvic-fin ray (247), and a longer fifth pelvic ray (105). Further, the two species differ in tongue shape (rounded in *C. benthonis,* indented in *C. vespa*).

R. S. Birdsong kindly allowed examination of a specimen of *Chriolepis* from Arrowsmith Bank off the Yucatan Peninsula (UMML uncat., R/V *PILLSBURY* station 584) which we believe represents the second known specimen of *C. benthonis*. It agrees with the holotype in dorsal-fin elements (VII-9) and anal-fin elements (8) and was taken relatively near (310 km SE) the type locality though in deeper water (approximately 350 vs. 154 m). Unfortunately, the scales are missing from the *PILLSBURY* specimen. A kodachrome taken of this specimen when initially captured reveals a pale yellow body and a vivid yellow wash on the head. No vertical bars are present on the body, although the head and body do have scattered chromatophores. Ginsburg (1953:22) described the color of the holotype of *C. benthonis* as ". . . a rather uniform light yellowish, probably faded . . ." and thus similar to the *PILLSBURY* specimen. If this uniform yellow color reflects the true coloration of *C. benthonis* and is not the result of fading, then *C. vespa* and *C. benthonis* differ markedly in color pattern, as vertical bars are prominent in *C. vespa*. Recent examination of the holotype of *C. benthonis* revealed no evidence of vertical bars.

According to the original description of the holotype (Herre, 1942), *C. fisheri* differs from *C. vespa* in several characters including head shape (more flattened in *C. fisheri*) and degree of squamation (body naked in *C. fisheri* with only one upper and one lower basicaudal scale present). Meristic differences between the two species include the number of anal-fin elements (10 in *C. fisheri*) and the number of second dorsal-fin elements (11 in *C. fisheri*), though a problematic specimen of *C. vespa* has 11 second dorsal-fin elements (see below). Further, the two species differ in coloration; six narrow crossbars, some of which extend upon the dorsal and anal fins, are present on the body of *C. fisheri* (Herre, 1942) while four are confined to the body of *C. vespa*.

Chriolepis vespa differs from the somewhat similar *Varicus bucca* Robins and Böhlke 1961, principally in the degree of branching of the pelvic-fin rays (unbranched in *V. bucca*), and in having fewer scale rows (27 in *V. bucca*). *Chriolepis vespa* differs from *Varicus marilynae* Gilmore 1979, which has slightly bifurcated pelvic-fin rays, in the number of second dorsal-fin elements (9 in *V. marilynae*), in having fewer scale rows (18–19 in *V. marilynae*), and in coloration (lower portion of head orange in *V. marilynae*).

Distribution and habitat.—The type specimens are from the northeastern Gulf of Mexico from off Mobile Bay, Alabama, to off Tampa Bay, Florida. One specimen was taken in 35 m while all others were from 183 m. Substrate at all localities was grey mud. An additional specimen which may be referable to this species (see below) was taken off Guyana (7°10′N, 53°36′W).

Etymology.—The name *vespa* is from the Latin "vespa," meaning wasp. This name is chosen to bring attention to the wasp-like olive banding of this species.

Discussion.—An additional specimen from off Guyana (UMML uncatalogued, R/V *PILLSBURY* station 658) which may represent *C. vespa* has apparently been lost (R. S. Birdsong and C. R. Robins, pers. comm.). A description of this specimen based on a black/white photograph and radiograph provided by Birdsong follows. Vertebrae 27; dorsal VII-11; anal 9. Ctenoid scales present on lateral portion of caudal peduncle. Enlarged ctenoid basicaudal scales (one upper and one lower) present on caudal-fin base. Chromatophores scattered over head and body, concentrated in four vertical bars on body. Light subocular bar present. Anal-fin margin and lower and distal caudal-fin margins black.

C. R. Robins, who examined this specimen and a kodachrome of a fresh paratype of *C. vespa,* indicated (pers. comm.) that the life colors of the *PILLSBURY* specimen closely resembled those of *C. vespa*. This record is tentatively referred to *C. vespa* because of its similar meristics (differs in having 11 instead of 10 second dorsal-fin elements) and color pattern. Considering the distance (approximately 3200 km) between collecting sites, this specimen needs further examination before positive identification can

be made. If it is found and proves to be *C. vespa,* it would increase the species' known distribution considerably.

The genera *Chriolepis* Gilbert and *Varicus* Robins and Böhlke have been distinguished (Böhlke and Robins, 1968) by the following characters: state of pelvic-fin ray branching (branched in *Chriolepis,* unbranched in *Varicus*), presence or absence of a low fleshy membrane connecting the inner pelvic-fin rays (absent in *Chriolepis,* present in *Varicus*), and tongue shape (rounded in *Chriolepis,* bilobed in *Varicus*). Generic allocation of *C. vespa* is based on the extent of branching of the pelvic-fin rays. However, as the degree of pelvic-fin ray branching increases ontogenetically in *C. vespa,* this character may be of little value in distinguishing these genera. Further, the other two characters used to separate these genera are invalidated by the discovery of *C. vespa.* A low fleshy ridge is present between the inner pelvic rays of *C. vespa* (this ridge is also present on several eastern Pacific members of the genus *Chriolepis,* L. T. Findley, pers. comm.; Findley, 1975) and the tongue is not rounded but has a distinct indentation anteriorly.

The generic alignment of *Varicus marilynae* Gilmore 1979, which has slightly bifurcated pelvic rays, is open to question considering the variation of this character in *C. vespa* and the inconsistency of the other available generic distinctions. The western Atlantic members of this entire group of seven-spined gobies with divided pelvic fins and no head pores is in need of revision, as several apparently undescribed forms with both branched and unbranched pelvic-fin rays exist. Definitive generic allocation of these and previously described forms awaits further study.

Comparative material examined.—Chriolepis sp., tentatively identified as *Chriolepis vespa*: UMML uncatalogued, R/V *PILLSBURY* station 658, 07°10′N, 53°36′W, off Guyana, 4 July 1968, depth 126–135 m (specimen not examined, apparently lost, black/white photograph and radiograph examined). *Chriolepis benthonis*: USNM 47641, holotype, off the Yucatan Peninsula, Mexico; UMML uncatalogued, R/V *PILLSBURY* station 584, 21°02′N, 86°24′W, Arrowsmith Bank off the Yucatan Peninsula, Mexico, 23 May 1967, depth 347–353 m. *Chriolepis fisheri*: SU 37262, holotype, Barbados (radiograph only). *Varicus bucca*: UMML 7114, paratype, Caribbean Sea (cleared-and-stained). *Varicus marilynae*: USNM 218406, holotype, Atlantic Ocean, Florida east coast; UF 24757, paratype, Gulf of Mexico, Florida west coast.

Acknowledgments

We thank C. R. Robins and R. S. Birdsong for allowing us to describe this species, which they also recognized as undescribed. Birdsong kindly provided several specimens and radiographs, a photograph and radiograph of the apparently lost R/V *PILLSBURY* specimen, and helpful comments

on the manuscript. L. T. Findley provided insight into *Chriolepis* systematics and a meticulous review of the manuscript. E. A. Lachner (USNM), C. R. Robins (UMML), and R. L. Shipp (USAIC) allowed examination of specimens in their care. T. Smoyer provided photographic assistance and C. Baker drew Fig. 3. Harbor Branch Foundation, Inc. contribution number 209.

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